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Is student motivation related to socio-digital participation? A person-oriented approach

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Abstract

There is a hypothesized gap between the technology-mediated practices of adolescents and school, hindering student motivation and well-being. This study examined how students' school motivation is associated with ICT-use. Previous research has shown that achievement goal orientations are related to students' academic and emotional functioning. Simultaneously, adolescents engage in various socio-digital activities on a daily basis. Our aim is to integrate these two approaches to examine whether students with different motivational profiles display different patterns of socio-digital participation. The participants were Finnish high school students (*N*=1342) who filled in a self-report questionnaire assessing school motivation and ICT-use both in and out of school. We examined the structural validity of the measurement model by confirmatory factor analyses, classified the students by latent profile analyses and examined group and gender differences by ANOVAs. Four groups were identified: indifferent, success-oriented, mastery-oriented, and avoidance-oriented. The groups differed in their generalized motivational beliefs and there were meaningful differences in terms of their orientations to socio-digital participation: e.g. indifferent students were more likely to engage in hanging-out and gaming, avoidance-oriented students were the least engaged in academic activities. Also, there were some interesting group × gender interaction effects. We found that students' indifference towards school is associated with ICT-engagement outside of school (gaming and hanging-out). We conclude that there appears to be evidence of discontinuities between today's schools and their students, raising a question of whether the indifference is the cause or the outcome. Furthermore, the findings raise new insights on achievement goal and gender interaction effects.

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Keywords: achievement goals, socio-digital participation, person-oriented approach

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1. Introduction

Over the past decade the adolescent life has been going through a vast revolution of mobile technologies and social media, adding new dimensions to the ways young people act, communicate and play within their environments. Moreover, novel technologies have greatly influenced the ways people work, learn, and create. However, in educational institutions the development has been rather modest. This, according to some educational experts, has contributed to creating a discontinuity, a gap, between the students that are connected to the digital society and the traditional practices that prevail in academic education. In this study, we explore connections between students' school-related achievement goal orientations, school engagement, and socio-digital participation in and out of school.

1.1. Achievement goal orientations

Achievement goal orientations represent the students' reasons for engaging in academic tasks. More specifically, achievement goal orientations describe students' general orientations towards learning and studying, in other words, the kinds of goals they tend to choose and the kinds of outcomes they prefer in relation to studying (Niemivirta, 2002). It has been proposed that the goals individuals are pursuing create the framework within which they interpret and react to events and that these frameworks produce patterns of cognition, emotion, and behavior (e.g., Dweck, 1986). Achievement goal theory has proven useful for understanding students' motivation for schoolwork.

The central distinction has been between students' strivings towards developing their competence and towards demonstrating their competence, that is, between mastery and performance goals. This dichotomous scheme has been expanded and additional goals related to achievement behavior have been described. Most importantly, Elliot and Harackiewicz (1996) introduced an expansion of the conceptualization of achievement goals by differentiating performance goals into performance-approach (directed at demonstrating competence) and performance-avoidance goals (directed at avoiding the demonstration of incompetence). Mastery goal orientation, also, has been divided into approach and avoidance components (Elliot & McGregor, 2001); however, the mastery-avoidance construct has to date received only limited empirical support. Other mastery-related nuances include mastery-extrinsic goals (Niemivirta, 2002), which refer to the goal of wanting to do well and achieving good grades. Students with this tendency seek to master tasks, and their focus is on absolute success (i.e., getting good grades) instead of relative success (i.e., outperforming others). In addition to striving for mastery and performance, students may have other goals that potentially affect their academic cognition and performance. Work avoidance has been recognized as one possible goal orientation, which means that the student does not wish to engage in academic activities and is especially pleased when he or she does not have to work hard (Nicholls, Patashnick, & Nolen, 1985).

The earlier work on achievement goals focused mainly on single goals and their effects on students' motivation and academic performance. At present, goal theorists widely accept the idea that students can and do pursue multiple goals simultaneously and, accordingly, they explore multiple goals and their relations to various outcomes by using a more person-oriented approach (e.g., Meece & Holt, 1993; Niemivirta, 2002; Pintrich, 2000).

There has been extensive research showing that achievement goal orientations matter, because they are associated with, for example, learning, motivation, study strategies, and various achievement-related outcomes. On the other hand, there is also evidence that achievement goal orientations are related not only to students' academic motivation and performance, but also to their more general socio-emotional functioning, that is, both school-related and general well-being (Daniels et al., 2008; Kaplan & Maehr, 1999; Tuominen-Soini, Salmela-Aro, & Niemivirta, 2008, 2012).

1.2. Socio-digital participation

By socio-digital technologies we refer to recently emerged integrated systems of novel technological tools, social media, and the Internet that enable constant and intensive online-interaction with information, people, and artefacts. These technologies are transforming adolescents' everyday life, their peer-relations as well as their interaction with the world around them. Despite earlier, naïve, claims of adolescents miraculous ICT-skills, it is now apparent that both the ICT-activities and the related competencies of adolescents are far from uniform and that the claims of a new technologically sophisticated generation are largely ungrounded (see e.g., Bennett & Maton, 2010; Margaryan,

Littlejohn, & Vojt, 2011). Thus, the emphasis is shifting towards examining the different ways young people engage in socio-digital participation.

Adolescents' different ways of socio-digital participation can be approached based on two motivational dimensions (Ito et al., 2010): friendship-driven, that is, using technologies to keep up and deepen already established social connections and, interest-driven, that is, utilizing modern technologies to learn and engage in activities based on a specific object of interest. Drawing on these dimensions, Ito and colleagues (2010) describe three levels of socio-digital participation: a) 'hanging out' including communication with friends and using technology for entertainment, b) 'messing around' with technology and media that engage in learning and complex problem solving, and c) 'geeking out' for seriously building object-oriented expertise related to digital technologies or creative working with media. Recent studies (e.g., Eynon & Malmberg, 2011; Kennedy et al., 2010, van den Beemt et al., 2011) addressing the variation in adolescents' technology-mediated activities resonate strongly with the findings of Ito and her colleagues. These share the key finding that, in terms of socio-digital technologies, the largest group of adolescents engages mostly in friendship-driven activities (e.g., interacting with friends, entertainment), and only a relatively small minority participates frequently in more demanding, interest-driven digitally mediated activities (e.g., building semi-professional skills mediated by socio-digital technologies).

As previous research suggests, adolescents' socio-digital participation practices are heterogeneous and should be approached as integrated in their everyday life. The offline and online are no longer clearly separated, it seems that offline and online contexts are intertwined in a dynamic interplay (Baym & Boyd, 2012). Thus it is important to examine the online practices of adolescents as also reflecting their individual and social ecologies. Further, we view adolescents' different ways of engaging with ICT as reflecting different knowledge practices (see Hakkarainen, 2009), manifested in the utilization of the tools and connections available. Thus, more demanding and complex technological engagement reflects, in our view, more complex knowledge practices.

2. Problem statement

As mentioned previously, achievement goal orientations have effects on the outcomes in their respective domain (i.e., academic outcomes) and also some effects on adolescents' more general socio-emotional functioning. We want to explore whether achievement goal orientations have effects even outside their respective domain, in this case, on adolescents' socio-digital participation. It appears that most of the adolescents engage in using technologies mainly to keep up their social networks and for entertainment, and only some of the youth engage in more demanding activities that require learning new skills and creating new networks of support. In this paper, we will look at the variation in adolescents' socio-digital participation through the variation in their school-related achievement goals. It is still very unclear how intensive engagement with digital tools and virtual communities outside of school, alongside emerging technology-mediated knowledge practices, are associated with motivation towards school, or if achievement goal orientations reflect more general motivational tendencies reaching further outside of their domain.

3. Research questions

Several prior studies have examined the issue of within-person achievement goal combinations (e.g., Niemivirta, 2002; Pintrich, 2000; Tuominen-Soini et al., 2008, 2011, 2012), but to our knowledge, none has investigated how the achievement goal profiles relate to adolescents' socio-digital participation. Accordingly, we addressed the following research questions:

- What kinds of achievement goal orientation profiles can be identified among high school students?
- How do students with different achievement goal orientation profiles differ with respect to other relevant dimensions of motivation (i.e., schoolwork engagement, school value, fear of failure, academic withdrawal) and academic achievement?
- What kinds of goal orientation group and gender differences are there regarding students' socio-digital participation? Are there gender differences in the goal orientation group compositions?

Based on prior work on Finnish students' motivation (Niemivirta, 2002; Tuominen-Soini et al., 2008, 2011, 2012), we hypothesized to find at least four goal orientation groups: students who display dominantly mastery tendencies,

students who emphasize mainly performance tendencies, students who display primarily avoidance tendencies, as well as students without a dominant tendency towards any specific achievement goal orientation. Moreover, we expected to find meaningful goal orientation group differences in other relevant school-related variables, consistent with prior studies (Tuominen-Soini et al., 2011, 2012). Differences in other dimensions of motivation and academic achievement were explored in order to further describe the characteristics of the motivational groups as well as to validate the clustering. In addition, we cautiously anticipated that there might be some goal orientation group differences even outside achievement goals' respective (i.e., academic) domain, in other words, in students' socio-digital participation: students who are indifferent regarding school might be engaged in socio-digital participation outside school, while students who are success- or mastery-oriented might be more likely to use technology to reinforce their academic activities. Finally, we examined gender differences. Although not a special focus of this study, we expected there to be considerable, foreseeable gender differences in the ICT-variables favoring boys (see e.g., Barron, 2004). In this study, we mainly focused on the possible goal orientation group and gender interaction effects on socio-digital participation as well as on the gender differences in the goal orientation group compositions.

4. Research methods

4.1. Context

In Finland, compulsory education starts in the year when a child turns seven and lasts nine years (see Finnish education in a nutshell, 2014). After completing compulsory schooling, young Finns can for the first time choose their educational track: whether to opt for general upper secondary education (high school) or vocational upper secondary education. Most students continue their studies after compulsory education; more than 90% starts general or vocational upper secondary studies immediately after basic education. For example, in the year 2012, 50.0% of comprehensive school leavers continued studying in high school and 41.5% in vocational institutions (Statistics Finland, 2012). Student selection to upper secondary schools is mainly based on the students' grades in their comprehensive school certificate. The syllabus of high school is designed to last three years. High school ends with a national matriculation examination. In Finland, the transition to upper secondary education is a key educational transition in adolescence and it can be a challenge for school adjustment. High school studies are different in structure from comprehensive school studies as students can decide on their individual study schedules rather freely.

4.2. Participants and procedure

This study is part of the ongoing Mind the Gap between Digital Natives and Educational Practices -project (2013–2016) funded by the Academy of Finland (Mind the Gap, 2014). The data used in the present study were collected between October 2013 and January 2014 in 16 high schools in Helsinki, Finland. The participants (N = 1342; Male = 398, Female = 835, 79 not reported) were first-year high school students that filled in a self-report questionnaire. The participants completed the questionnaire during regular school hours. Participation in the study was voluntary and informed consent forms were collected from both the students and their parents.

4.3. Measures

The self-report questionnaire assessed students' achievement goal orientations, other relevant motivational indices (i.e., schoolwork engagement, school value, fear of failure, and academic withdrawal), academic achievement, and orientations towards socio-digital participation, as well as background information.

4.3.1. Achievement goal orientations

Using an instrument developed by Niemivirta (2002), five types of achievement goal orientations were assessed: mastery-intrinsic, mastery-extrinsic, performance-approach, performance-avoidance, and avoidance. The scales assessed students' general orientations to learning and studying. The scale for *mastery-intrinsic orientation* comprised three items assessing students' focus on learning, understanding, and gaining competence (e.g., "To

acquire new knowledge is an important goal for me in school"). The scale for *mastery-extrinsic orientation* comprised three items assessing students' aspirations for getting good grades and succeeding in school (e.g., "It is important for me to get good grades"). The scale for *performance-approach orientation* comprised three items assessing students' focus on relative ability and judgements of competence (e.g., "An important goal for me in school is to do better than the other students"). The scale for *performance-avoidance orientation* comprised three items assessing the avoidance of demonstrating normative incompetence (e.g., "I try to avoid situations in which I may fail or make mistakes"). The scale for *avoidance orientation* (referring to work avoidance, see Nicholls et al., 1985) comprised three items reflecting students' desire to avoid achievement situations and minimize the effort and time spent on studying (e.g., "I try to get away with as little effort as possible in my school work"). Students rated all items using a 7-point Likert-type scale ranging from 1 (*Not true at all*) to 7 (*Very true*). Composite scores were computed separately for the five orientations.

4.3.2. Schoolwork engagement, school value, fear of failure, academic withdrawal, and academic achievement

Schoolwork engagement was assessed by using the Schoolwork Engagement Inventory (EDA; Salmela-Aro & Upadyaya, 2012). The scale consists of nine items measuring vigor (e.g., "When I study, I feel that I am bursting with energy"), dedication (e.g., "I am enthusiastic about my studies"), and absorption (e.g., "Time flies when I'm studying") in relation to schoolwork. Students rated all items on a 7-point Likert-type scale ranging from 0 (*Never*) to 6 (*Every day*). A composite score was computed from all nine items. The scale for *lack of school value* (Niemivirta, 2004) comprised three items assessing students' perceived importance, utility, and interestingness of studying (e.g., "I think going to school is a waste of time"). The scale for *fear of failure* (Niemivirta, 2002) comprised three items assessing students' preoccupation with possible failures in school (e.g., "I always worry about failing in tests and exams"). The scale for *academic withdrawal* (Niemivirta, 2002) comprised three items reflecting students' generalized tendency to withdraw from demanding school tasks (e.g., "I have realized that I give up easily if school tasks are difficult"). All items were rated using a 7-point Likert-type scale ranging from 1 (*Not true at all*) to 7 (*Very true*). We used students' self-reported grade point average (GPA) from their comprehensive school certificate as a measure of their academic achievement. The GPA ranges from 4 (= lowest) to 10 (= highest).

4.3.3. Socio-digital participation and ICT-related skills

The orientations towards socio-digital participation were measured with an Internet Activities Inventory (IAI) and Gaming Preferences Inventory (GPI), both of which are based on previous studies on the topic (e.g., Barron, 2004; Hakkarainen et al., 2000) and revised and developed further by the authors (Hietajärvi et al., in preparation). Adolescents' variation in ICT-use can be conceptualized through the different orientations that their technology mediated activities represent. The variation in the intensity and complexity of their socio-digital participation is seen as representing their degree of engagement based on the corresponding orientation.

Accordingly, the Internet Activities Inventory includes four conceptually distinct yet empirically related dimensions that consist of 28 items measuring both non-academic and academic activities. Non-academic internet activities were assessed with three scales: *hanging out* (9 items; e.g., "I visit and send messages at social media sites", "I follow my friends' profiles, pictures, and updates in internet"), *creative participation* (7 items; e.g., "I share music that I have created or mixed"), and *information-oriented participation* (7 items; e.g., "I write or make comments on discussion forums", "I search new information about my hobbies or things I am interested in"). School-related internet activities were assessed with one scale: *academic participation* (5 items; e.g., "I search information on internet related to my schoolwork", "I ask help from my friends online in relation to schoolwork").

Gaming preferences were assessed with four scales: a scale of *gaming seriousness* (6 items; e.g., "Gaming is a very important hobby for me") and three scales of game genre preferences: *action games* (4 items; e.g., "How often do you play first-person shooter -games?"), *recreational games* (4 items; e.g., "How often do you play music, rhythm or dance games?"), and *sports games* (2 items; e.g., "How often do you play sports games?"). The participants rated all items using a 7-point Likert-type scale ranging from 1 (*Never*) to 7 (*All the time*).

The ICT-related subjective skills were measured with a set of items derived from earlier research (Barron, 2004; Hakkarainen et al., 2000) as well as the authors' experience in education and ICT. ICT-related skills were measured with 14 items representing two separate skillsets: 9 items assessing *advanced skills* (e.g., "How competent you see

yourself in programming?") and 6 items assessing *basic skills* (e.g., "How competent you see yourself in editing text documents?"). Sum variables were constructed by calculating the averages of each item in each construct.

4.4. Data analyses

First, preliminary analyses concerning structural validity of the clustering variables (i.e., achievement goal orientations) were conducted using confirmatory factor analysis (CFA). A model was specified in which all items for each scale were allowed to load on the corresponding factor only. We evaluated the model fit using three fit indices: the root mean square error of approximation (RMSEA) with a cutoff value of < .08, the comparative fit index (CFI) with a cutoff value of > .90, and the standardized root mean square residual (SRMR) with a cutoff value of < .09. The analysis was performed using Mplus statistical package (Muthén & Muthén, 1998–2010), and all solutions were generated using maximum likelihood (ML) estimation.

Second, following a person-oriented approach (see Bergman, Magnusson, & El-Khouri, 2003), we subjected achievement goals to latent class modelling. Students with similar patterns of goal orientations were identified through latent profile analysis (LPA). For determining statistically the most correct number of profiles, we used Bayesian Information Criterion (BIC) and Vuong-Lo-Mendell-Rubin (VLMR) nested model comparison. VLMR tests the fit between model k and k-1. A lower BIC value suggests a better fit and a *p*-value of VLMR less than .05 indicates that k-1 should be rejected in favor of the estimated model k. We also considered classification quality (i.e., entropy value), the interpretableness of the latent classes, and the reasonableness of the solutions with respect to theory and prior research. A series of LPAs was carried out using the students' goal orientations as clustering variables. Prior to entering the LPA, the variables were standardized.

Third, we conducted one-way ANOVAs to examine group differences in the clustering variables (i.e., achievement goal orientations) and criterion variables (i.e., other motivational indices and academic achievement). Because we hypothesized that there might be clear gender differences in the measures of socio-digital participation, we conducted two-way (goal group × gender) ANOVAs to examine differences in socio-digital participation and ICT-related skills. Finally, we investigated gender differences in the group compositions by crosstabulation.

5. Results

5.1. Preliminary results

Missing values in the data were treated so that all cases with more than one missing value (30 cases) in the clustering variable items were eliminated. After which the remaining missing values ($f = 87$, 0.44%) in the clustering variables were imputed using the Expectation Maximization algorithm in SPSS (Little's MCAR test: χ^2 (210) = 197.53, p = .722). The imputed data was used in the LPAs. Also, three cases with implausible values (+−4SD) concerning the clustering variables were eliminated prior to entering LPAs. The missing values in other variables included in this study were treated either listwise or analysis by analysis.

The initial CFA on achievement goal orientations fit the data rather well, χ^2 (80, $N = 1309$) = 714.475, $p < 0.001$, RMSEA = .078, CFI = .93, SRMR = .06. However, an examination of the modification indices suggested a few minor changes to the model. Error covariances were freed between two similarly worded items within scales. Consequently, the model provided a better fit, χ^2 (78, $N = 1309$) = 563.475, $p < 0.001$, RMSEA = .069, CFI = .94, SRMR = .054. Correlations, descriptive statistics, and Cronbach's alphas are presented in Appendix. The mean scores of the items loading on each factor were used for subsequent analyses.

Correlational results revealed that, for instance, students' GPA was negatively associated with most of the dimensions of socio-digital participation; most notably with hanging out, creative participation, gaming, and advanced ICT-skills. Further, avoidance tendencies were positively associated with gaming, that is, serious gaming and action games. In turn, mastery tendencies were moderately positively correlated with academic participation.

5.2. Achievement goal orientation profiles

The first aim of this study was to examine what kinds of goal orientation profiles can be identified among high school students. The results from the LPAs (see Table 1) showed that the BIC decreased when additional latent classes were added, but the VLMR test provided support for the four- and six-class solutions. According to the fit

indices, a six-class solution would have provided marginally the best fit, but because the decrease in BIC was rather small, we ended up with the expected four-class solution. Most importantly, the classes in the chosen solution were useful and interpretable as well as in line with prior research (Tuominen-Soini et al., 2011, 2012). The average individual posterior probabilities for being assigned to a specific class were in the four-class model 0.87, 0.83, 0.80, and 0.85. These indicated that the four-class model provided a clear classification. The groups were labelled based on the score mean profiles as: indifferent, success-oriented, mastery-oriented, and avoidance-oriented.

Table 1. Information criteria values for different class solutions.

Number of classes	BIC	Adjusted BIC	p_{VLMR}
3	17668.326	17598.442	0.0000
4	17520.554	17431.612	0.0002
5	17495.767	17387.765	0.0781
6	17455.052	17327.991	0.0172
7	17448.141	17302.021	0.0667

As illustrated in Figure 1 and Table 2, there were four clearly distinct goal orientation profiles. The students in the *indifferent* group (n = 474, 36%) had average scores on all orientations; this group had a relatively flat profile. They did not display a dominant tendency towards any specific achievement goal orientation. *Success-oriented* students (n = 415, 32%) expressed high levels of mastery-intrinsic, mastery-extrinsic, and both performance orientations. *Mastery-oriented* students (n = 306, 23%) emphasized mastery-intrinsic and mastery-extrinsic orientations but had low scores on all the other orientations. *Avoidance-oriented* students (n = 114, 9%) scored the highest on avoidance orientation and, in contrast, very low on mastery-intrinsic and mastery-extrinsic orientations.

Table 2. Mean differences in achievement goal orientations between goal orientation groups.

Variable	Indifferent n = 474		Success-oriented n = 415		Mastery-oriented n = 306		Avoidance-oriented n = 114				
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F* (3, 1305)	*p*	η^2
Mastery-intrinsic[1]	4.58	.87	5.86_a	.82	5.76_a	.88	3.78	1.00	306.44	<.001	.41
Mastery-extrinsic	5.22	.63	6.50	.48	6.00	.65	3.72	.63	812.04	<.001	.65
Performance-approach[1]	4.09	.91	5.31	.90	2.76_a	.95	2.59_a	.91	560.00	<.001	.56
Performance-avoidance	4.29	1.28	5.00	1.41	2.67	1.12	3.39	1.49	201.20	<.001	.32
Avoidance	4.89	.98	4.16	1.20	3.45	1.09	5.22	1.18	135.49	<.001	.24

Note. Means sharing the same subscripts are not significantly different at the $p < 0.05$ level (with Games-Howell correction, [1]with Bonferroni correction).

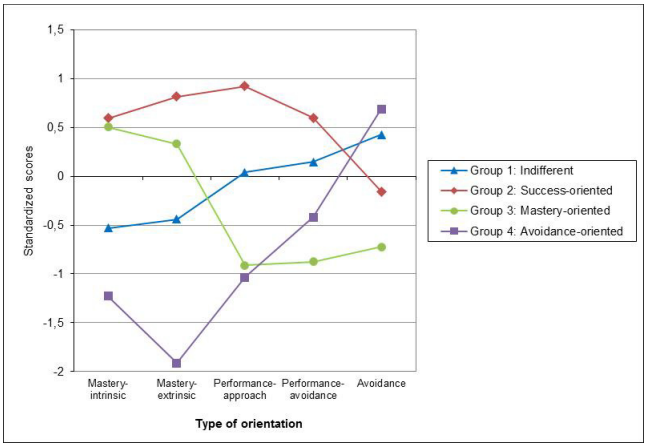

Figure 1. Achievement goal orientation profiles.

5.3. Goal orientation group differences in other dimensions of motivation and academic achievement

Our second aim was to look at the group differences in relation to other relevant school-related variables in order

to further describe the characteristics of the motivational profiles. All effects and mean differences are summarized in Table 3. The groups differed significantly in all of the criterion variables. The pairwise comparisons of means revealed that mastery- and success-oriented students displayed highest engagement, while avoidance-oriented students reported lowest engagement. Mastery-oriented students valued school the most, followed by success-oriented students, while avoidance-oriented students valued school the least. Interestingly, the two groups that emphasized outperforming others the most (success-oriented and indifferent) were also the most preoccupied with possible failures in school. Mastery- and avoidance-oriented students had lower scores in fear of failure. Mastery-oriented students scored the lowest on academic withdrawal, while it was more typical for avoidance-oriented and indifferent students to give up when facing difficult tasks. With respect to academic achievement, mastery- and success-oriented students reported equally high GPA, while avoidance-oriented students reported lowest GPA.

Table 3. Mean differences in motivational indices and academic achievement between goal orientation groups.

Variable	Indifferent		Success-oriented		Mastery-oriented		Avoidance-oriented				
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F* (df)	*p*	η^2
Schoolwork engagement	4.27	1.10	5.08_a	1.06	5.24_a	.92	3.37	1.27	(3, 1303) = 128.57	<.001	.23
Lack of school value	2.84	.94	2.18	.82	1.89	.66	3.36	1.29	(3, 1280) = 123.52	<.001	.23
Fear of failure	4.21	1.24	4.71	1.56	3.49_a	1.24	3.46_a	1.39	(3, 1286) = 56.79	<.001	.12
Academic withdrawal	4.22_a	1.17	3.79_b	1.39	3.01	1.18	4.04_{ab}	1.45	(3, 1291) = 57.18	<.001	.12
Academic achievement[1]	8.72	.69	9.05_a	.68	8.98_a	.69	8.47	.65	(3, 1280) = 32.15	<.001	.07

Note. Means sharing the same subscripts are not significantly different at the $p < 0.05$ level (with Games-Howell correction, [1]with Bonferroni correction).

5.4. Goal orientation group and gender differences in socio-digital participation and ICT-related skills

The third aim of the present study was to investigate how students with different goal orientation profiles differ with respect to socio-digital participation. Furthermore, we wanted to check whether socio-digital participation varies as a function of gender. A two-way (4 × 2) ANOVAs were carried out with goal orientation group, gender, and their interactions as independent variables and socio-digital participation measures as dependent variables. All effects are reported in Table 4. The mean differences between goal orientation groups are summarized in Table 5.

First, the ANOVA revealed a significant main effect for both group membership and gender on hanging out. The pairwise comparisons of means showed that indifferent students were more likely to engage in hanging out compared to both mastery- and success-oriented students. Further, girls ($M = 4.09$) were, in general, more likely to participate in hanging out than boys ($M = 3.84$). For creative participation, there were no significant effects. For information-oriented participation, there were no group effect; however, there was a significant gender effect and, more interestingly, a significant group × gender interaction. The pairwise comparisons suggested that girls ($M = 2.71$) were more engaged in information-oriented participation than boys ($M = 2.64$). The interaction effect revealed that especially the avoidance-oriented girls ($M = 2.90$) engaged in information-oriented participation (e.g., blogging) compared to the boys ($M = 2.30$). For academic participation, we only found a significant main effect for group membership revealing that avoidance-oriented students were the least likely to use ICT to participate in academic-oriented activities.

In relation to gaming, the group membership did have a significant main effect for both gaming seriousness and action games. A significant gender effect was also discovered with respect to the previously mentioned variables as well as sports games. Both the indifferent and success-oriented students were more likely to be serious in their gaming preferences than mastery-oriented students and were also more likely to play action games, and in general, boys were more likely to engage in all of the above. However, we also found a significant interaction effect suggesting that especially both success-oriented ($M_{boys} = 3.22$; $M_{girls} = 1.43$) and indifferent boys ($M_{boys} = 3.13$; $M_{girls} = 1.41$) were the most likely to be more seriously involved in gaming.

In terms of skills, a significant main effect was found for group on basic skills, revealing that both mastery- and success-oriented students reported higher values compared to avoidance-oriented students (success-oriented students also reported higher values than indifferent students). Also, a significant effect was found for gender on advanced skills, indicating that boys ($M = 2.19$) report more advanced skills than girls ($M = 1.83$). A near significant interaction effect was also discovered suggesting that especially the mastery-oriented ($M_{boys} = 2.20$; $M_{girls} = 1.82$) and success-oriented ($M_{boys} = 2.30$; $M_{girls} = 1.85$) boys were the ones more likely to report higher advanced skills.

There were some small differences in how girls and boys were distributed in the goal orientation groups, $\chi^2(3) =$

15.02, p = .002, C = 0.11. Boys were underrepresented in the mastery-oriented group (std. res. = −2.1) and overrepresented in the indifferent group (std. res. = 2.2). In the other groups girls and boys were equally distributed.

Table 4. Analysis of variance for socio-digital participation.

	Independent variables											
	Group				Gender				Group × Gender			
Dependent variables	*df*	*F*	*p*	η^2	*df*	*F*	*p*	η^2	*df*	*F*	*p*	η^2
Hanging out	3, 1155	6.82	.000	.02	1, 1155	22.89	.000	.02	3, 1155	.21	.888	.00
Creative participation	3, 1186	.13	.941	.00	1, 1186	1.18	.277	.00	3, 1186	.81	.491	.00
Information-oriented part.	3, 1177	1.77	.152	.00	1, 1177	8.02	.005	.01	3, 1177	3.62	.013	.01
Academic participation	3, 1185	4.49	.004	.01	1, 1185	.58	.445	.00	3, 1185	1.52	.207	.00
Gaming seriousness	3, 1204	8.43	.000	.02	1, 1204	517.98	.000	.30	3, 1204	3.85	.009	.01
Action games	3, 1190	3.27	.021	.01	1, 1190	403.09	.000	.25	3, 1190	1.86	.134	.01
Recreational games	3, 1181	.91	.438	.00	1, 1181	.12	.726	.00	3, 1181	.51	.679	.00
Sports games	3, 1192	.12	.951	.00	1, 1192	369.43	.000	.24	3, 1192	.86	.460	.00
Advanced skills	3, 1174	2.29	.076	.01	1, 1174	34.87	.000	.03	3, 1174	2.57	.053	.01
Basic skills	3, 1180	8.16	.000	.02	1, 1180	.34	.559	.00	3, 1180	1.61	.185	.00

Table 5. Mean differences in socio-digital participation between goal orientation groups.

Variable	Indifferent		Success-oriented		Mastery-oriented		Avoidance-oriented	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Hanging out	4.14_{a}	.79	3.91_{b}	.93	3.93_{b}	.83	4.12_{ab}	.80
Creative participation	1.51	.61	1.49	.64	1.47	.51	1.53	.57
Information-oriented participation	2.72	.84	2.72	.92	2.61	.80	2.69	1.00
Academic participation	2.65_{a}	.79	2.75_{a}	.88	2.69_{a}	.86	2.40	.88
Gaming seriousness	2.07_{a}	1.29	1.95_{a}	1.28	1.62_{b}	1.03	1.80_{ab}	1.00
Action games	2.04_{a}	1.15	1.96_{a}	1.09	1.73_{b}	.99	1.98_{ab}	1.04
Recreational games	2.01	.69	2.06	.74	1.93	.74	1.99	.77
Sports games	1.98_{a}	1.05	1.84_{ab}	1.03	1.77_{b}	.91	1.97_{ab}	.1.04
Advanced skills	1.95	.69	1.98	.75	1.91	.70	1.87	.57
Basic skills	4.23_{ac}	.57	4.37_{b}	.54	4.31_{ab}	.57	4.13_{c}	.61

Note. Means sharing the same subscripts are not significantly different at the $p < 0.05$ level (with Games-Howell correction, [1]with Bonferroni correction).

6. Discussion

In identifying high school students' goal orientation profiles, we found, as anticipated and consistent with prior research (Niemivirta, 2002; Tapola & Niemivirta, 2008; Tuominen-Soini et al., 2011, 2012), four groups of students with distinct motivational profiles. Over one third of students belonged to the indifferent group, which can be seen as representing a "typical" student who does acknowledge the goals of learning and doing well in school, but is reluctant to invest effort in the attainment of those goals. Also, it seems common for high school students to emphasize performance-tendencies and to endorse multiple goals simultaneously, because as much as 32% of the students were identified as success-oriented. These students, while emphasizing learning, were simultaneously clearly preoccupied with social comparison and outperforming others. In turn, mastery-oriented students (23%) were mostly concerned about their own learning and understanding and, accordingly, they displayed a very adaptive motivational profile. In addition, there was a rather small group of avoidance-oriented students (9%) actively avoiding all school-related work and, therefore, showing the most negative motivational profile.

The groups differed in terms of their generalized motivational beliefs and academic achievement and there were some meaningful differences even in their orientations of socio-digital participation. Mastery- and success-oriented students were highly engaged in studying, valued school, and were doing well in school, although the success-oriented students were more preoccupied with possible failures in school. Indifferent and avoidance-oriented students showed less adaptive patterns of motivation compared to mastery- and success-oriented students.

Furthermore, adaptive motivational orientations towards school were also associated with higher ICT-skills and use of ICT for academic purposes. In turn, more maladaptive orientations were associated with being more likely to use social media intensively (especially so for girls), and with more intense gaming (especially for boys). Surprisingly, despite the negative association between GPA and gaming, both indifferent and success-oriented boys were likely to be active gamers, suggesting that the interrelations are complex. Moreover, it was interesting that

creative participation and advanced skills, mastering which takes dedication; self-regulation and countless hours of practice were negatively associated with GPA. Could it be that these students' energy and dedication is directed outwards from the academic setting, thus having an effect on the academic performance? This is interesting, as we can only speculate the possible direction of the effect. However, if this is the case, it means that our educational system might be experiencing a brain drain. This, in our view, should be plugged by making education relevant.

Obviously, this study has its limitations also. Like all survey based research, our data was self-report and thus subject to bias. The sample consisted only of high school students, which is a selected group. The participation to this study was voluntary, so that it is possible that only certain types of high school students participated, thus the sample may lack generalizability. This study was cross-sectional by design which renders if impossible to conclude any developmental dynamics. The model specified for measuring the socio-digital participation, even though based on previous studies, is still more or less under development. Due to the experimental status of the measures there was also floor-effect on some of the variables, causing lack of statistical power that may have caused some effects to remain insignificant. Further, as the context of socio-digital technologies is in a state of flux, the measures need to be continuously adapted and may end up being out of date, which needs to be considered in future studies.

We observed that different motivational tendencies towards school were associated with different patterns of socio-digital participation. This indicates that in contrast to being separate, isolated activities, we should view the ways of adolescents' technologically mediated participation as integrated knowledge practices (see Hakkarainen, 2009) reflecting both the individual and social factors that are intertwined in daily life. Using technologies is not just using technologies; it is an inseparable part of the interaction between the youth and the world. Thus, we would speculate, that more complex technology-mediated knowledge practices are both a result and a catalyst for deep learning that should also be pursued in educational settings. However, to a degree, our results hint that these knowledge practices are not properly recognized in academic institutions.

We conclude that there appears to be evidence of discontinuities between today's schools and their students, raising a question of whether the indifference is the cause or the outcome. This should be taken into account by educators in designing learning environments and practices more suited for today's adolescents. School should be made relevant. Furthermore, the findings raise new insights on achievement goal and gender interaction effects. The achievement goals seem to have explanatory power even for the outcome variables outside their relevant domain, in this case, socio-digital participation. This gives reason to speculate that certain school related motivational tendencies are interacting with the ways students engage with technology and media in their everyday life, and vice versa. However, to draw a reliable conclusion and to shed light on the direction of the observed effects, more future studies with complimentary qualitative and quantitative methods and a longitudinal approach are called for.

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Appendix. Factor correlations, descriptive statistics, and internal consistencies.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
1. Mastery-intrinsic	–																			
2. Mastery-extrinsic	.51**	–																		
3. Performance-approach	.20**	.37**	–																	
4. Performance-avoidance	.01	.11**	.46**	–																
5. Avoidance	-.32**	-.29**	.07*	.17**	–															
6. Schoolwork engagement	.52**	.40**	.11**	-.14**	-.45**	–														
7. Lack of school value	-.51**	-.42**	.00	.15**	.48**	-.50**	–													
8. Fear of failure	-.03	.20**	.35**	.57**	.08**	-.08**	.17**	–												
9. Academic withdrawal	-.27**	-.17**	.14**	.42**	.40**	-.38**	.42**	.54**	–											
10. GPA	.22**	.32**	.09**	-.06*	-.18**	.23**	-.27**	-.14**	-.27**	–										
11. Hanging out	-.08**	-.11**	.05	-.00	.09**	-.05	.13**	.10**	.20**	-.23**	–									
12. Creative participation	-.00	-.12**	.06*	.05	.10**	-.03	.13**	.05	.10**	-.18**	.45**	–								
13. Information-oriented particip.	.04	-.05	.09**	.12**	.05	.02	.07*	.07**	.12**	-.07*	.49**	.48**	–							
14. Academic participation	.15**	.08**	.11**	-.01	-.08**	.20**	-.07*	.05	-.00	.04	.40**	.33**	.24**	–						
15. Gaming seriousness	.00	-.09**	.13**	.09**	.21**	-.04	.16**	-.05	.00	-.18**	-.03	.20**	13**	.10**	–					
16. Action games	-.01	-.12**	.08**	.08**	.19**	-.04	.10**	-.04	.00	-.23**	.01	.23**	.16**	.11**	.80**	–				
17. Recreational games	.01	-.02	.08**	.04	.02	.04	.04	.05	.05	-.06*	.18**	.19**	.19**	.17**	.19**	.30**	–			
18. Sports games	-.04	-.07*	.05	.00	.11**	-.03	.14**	-.09**	-.02	-.21**	.07*	.14**	.09**	.09**	.46**	.51**	.37**	–		
19. Advanced skills	.04	-.06*	.09**	.04	.04	-.00	.09**	-.04	-.04	-.18**	.21**	.42**	.35**	.21**	.39**	.40**	.14**	.21**	–	
20. Basic skills	.14**	.12**	.08**	-.01	-.01	.12**	-.10**	-.10**	-.11**	-.04	.22**	.12**	.21**	.16**	.16**	.18**	.07**	.08**	.47**	–
Raw *M*	5.19	5.68	4.03	4.06	4.35	4.68	2.45	4.14	3.78	8.87	4.01	1.50	2.70	2.68	1.92	1.95	2.01	1.89	1.96	4.28
SD	1.13	1.00	1.39	1.58	1.25	1.21	1.00	1.45	1.35	.71	.86	.60	.88	.85	1.23	1.10	.73	1.01	.71	.57
Cronbachs alpha	.85	.84	.73	.86	.69	.92	.71	.76	.73	–	.83	.79	.73	.79	.87	.83	.64	.63	.80	.80

Note. * $p < .05$. ** $p < .01$.

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